Amendments to the Claims:

In the Claims:

Claims

1 (Currently amended) A method for automatic alignment of tilt series ~~(2-i)~~ in an electron microscope, comprising:

* applying markers ~~(8-i)~~ to a sample ~~(2)~~ to be imaged by the electron microscope;
* providing a tilt series of images ~~(2-i)~~ of the sample;
* identifying a first set of candidate markers ~~(8-i)~~ in each of the images in the tilt series;
* attributing at least one probability parameter to each candidate marker in each image;

characterized in that the method further comprises:

* selecting a second set ~~(16-i)~~ as a subset of candidate markers from the first set of candidate markers on the basis of said at least one probability parameter;
* projecting the candidate markers in the second set onto a sole image;
* applying a fitting algorithm to determine a set of parallel straight lines or very elongate ellipses ~~(20-i)~~ best fitting the candidate markers in the sole image;
* aligning the images in the tilt series on the basis of the identified candidate markers.

2 (Original) A method according to Claim 1 in which the fitting algorithm used to determine the set of parallel straight lines comprises the Hough transformation.

3 (Original) A method according to Claim 1 in which the fitting algorithm used to determine the set of parallel straight lines or to determine a set of very elongate ellipses is constituted by the Generalized Hough transformation.

4 (Original) A method according to Claim 1 in which, before identifying candidate markers in each of the images in the tilt series, a cross correlation process is applied to the images of the tilt series.

5 (Currently amended) A method according to ~~any of the preceding Claims~~ Claim 1 in which the probability parameter is derived from at least one of the quantities: size of the marker and local contrast of the marker.

6 (Currently amended) A method according to Claim 2 in which the fitting algorithm further comprises:

* deriving for each candidate marker a sine-shaped curve ~~(24)~~ based on the co-ordinates of the corresponding candidate marker, according to the Hough transformation;

* deriving from the sine-shaped curves a number of histograms ~~(fig.4)~~ indicating, for each direction ~~(a)~~, the relation between the density of candidate markers and the line distance parameter ~~(r)~~ according to the Hough transformation;

* applying an entropy ~~(S)~~ operation to each of the histograms, resulting in a set of entropy parameters ~~(S_1)~~, one entropy parameter for each histogram;

* establishing the minimum value in the set of entropy parameters;

* identifying the histogram corresponding to said minimum value as the one showing the highest degree of peak diversity;

* selecting from the latter histogram a number of peaks;

* deriving from each peak position in the histogram the corresponding line distance parameter according to the Hough transformation.

7 (New) A method according to Claim 2 in which the probability parameter is derived from at least one of the quantities: size of the marker and local contrast of the marker.

8 (New) A method according to Claim 3 in which the probability parameter is derived from at least one of the quantities: size of the marker and local contrast of the marker.

9 (New) A method according to Claim 4 in which the probability parameter is derived from at least one of the quantities: size of the marker and local contrast of the marker.